

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of the Claims:

1-21. (Cancelled)

22. (New) A method for rapidly heating and cooling semiconductor wafers in a thermal processing chamber, said method comprising the steps of:

placing a semiconductor wafer in a substrate holder contained in a thermal processing chamber;

rapidly heating said semiconductor wafer to a predetermined temperature using a heat source; and

cooling said semiconductor wafer using an active cooling device, said cooling device comprising a cooling member maintained at a temperature lower than the wafer; wherein said cooling member defines one or more cooling channels for circulating a cooling fluid therethrough and defines one or more gas passages for flowing a cooling gas therethrough; and wherein said gas passages are configured to direct said cooling gas towards said semiconductor wafer and said substrate holder so that said cooling gas contacts said semiconductor wafer and cools said wafer.

23. (New) The method of claim 22, wherein said cooling gas is cooled by said cooling member.

24. (New) The method of claim 22, wherein said cooling gas is cooled by said cooling fluid circulating through said cooling channels.

25. (New) The method of claim 22, wherein said cooling fluid is a liquid.

26. (New) The method of claim 25, wherein said liquid is water.

27. (New) The method of claim 22, wherein said cooling fluid is a gas.

28. (New) The method of claim 22, further comprising adjusting the flow of said cooling gas through said one or more gas passages for controlling the cooling of said semiconductor wafer.

29. (New) The method of claim 22, further comprising adjusting the circulation of said cooling fluid through said one or more cooling channels for controlling the cooling of said semiconductor wafer

30. (New) The method of claim 22, wherein said cooling device selectively cools said semiconductor wafer.

31. (New) The method of claim 22, wherein said cooling device is stationary relative to said semiconductor wafer and said substrate holder.

32. (New) The method of claim 22, wherein said cooling device is movable relative to said semiconductor wafer and said substrate holder.

33. (New) The method of claim 22, wherein said substrate holder is adapted to hold and rotate said semiconductor wafer.

34. (New) The method of claim 22, wherein said heat source includes one or more lamps.

35. (New) The method of claim 22, wherein said cooling gas is an inert gas.

36. (New) The method of claim 22, wherein said cooling gas is molecular nitrogen, argon, or helium.

37. (New) The method of claim 22, further comprising monitoring the temperature of said semiconductor wafer while said wafer is in said thermal processing chamber.

38. (New) The method of claim 37, wherein a temperature sensing device monitors the temperature of said semiconductor wafer.

39. (New) The method of claim 38, wherein said temperature sensing device is configured to monitor the temperature of said semiconductor wafer at a single location on said wafer or at a plurality of locations on said wafer.

40. (New) The method of claim 38, wherein said temperature sensing device is in communication with a controller, and wherein said controller receives temperature information from said temperature sensing device and, based on said information, controls the heating and cooling of said semiconductor wafer.

41. (New) The method of claim 40, wherein said controller is in communication with said heat source, and wherein said controller receives temperature

information from said temperature sensing device and, based on said information, controls said heat source for controlling the heating of said semiconductor wafer.

42. (New) The method of claim 40, wherein said cooling device further comprises a gas source for supplying said gas to said one or more gas passages, said gas source being in communication with said controller such that said controller is configured to control the flow of gas from said gas source to said gas passages for controlling the cooling of said semiconductor wafer.

43. (New) The method of claim 42, wherein said controller controls the flow of gas from said gas source to said gas passages based on temperature information received from said temperature sensing device.

44. (New) A method for rapidly heating and cooling semiconductor wafers in a thermal processing chamber, said method comprising the steps of:

placing a semiconductor wafer in a substrate holder contained in a thermal processing chamber;

rapidly heating said semiconductor wafer to a predetermined temperature using a heat source, wherein said heat source includes one or more lamps;

cooling said semiconductor wafer using an active cooling device, said cooling device comprising a cooling member maintained at a temperature lower than the wafer, wherein said cooling member defines one or more cooling channels for circulating a cooling fluid therethrough and defines one or more gas passages for flowing a cooling gas therethrough; wherein said gas passages are configured to direct said cooling gas towards said semiconductor wafer and said substrate holder so that said cooling gas contacts said semiconductor wafer and cools said wafer; and

monitoring the temperature of said semiconductor wafer during said heating and said cooling using a temperature sensing device.